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SEASONAL PROGRESS REPORT NO. 4
for the period
December 1976, January and February 1977

to

ENVIRONMENTAL PROTECTION AGENCY
REGION VIII
1860 Lincoln St., Suite 900
Denver, CO 80203

Contract No. 68-01-1946

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by

Aeromet, Inc.
P.O. Box FF
Norman, OK 73070

1.0 INTRODUCTION

Low level temperature and wind data were collected for the winter season of December 1976, January and February 1977 at Casper, Wyoming; the Colorado C-b Tract 25 miles west of Rio Blanco, Colorado; Craig, Colorado; Escalante and Hanksville, Utah; Rock Springs, Wyoming; and the U-a/U-b Tract 5 miles south of Bonanza, Utah. The collection of data at the U-a/U-B site commenced October 1, 1976 and will continue through 30 September, 1977. The data were collected using a 30 gm helium filled pilot balloon with a temperature sonde attached, a single theodolite and a TSR-2 receiver/recorder twice a day every other day. The observations were made ½ hour after sunrise and at 1400L.

The pilot balloon had an ascent rate of 500 ft/min and it was tracked by a single theodolite for 12 minutes with the azimuth and elevation angles recorded every 30 seconds on a cassette tape recorder. The tape was transcribed to a pilot balloon form after the observation.

The temperature sonde operated at 403 MHz and the signal was received by a ground plane antenna at least 24 ft. AGL which was attached to the Aeromet, Inc. TSR-2 receiver/recorder. The TSR-2 receiver has a built-in Rustrak strip chart recorder and the temperature was recorded within the range from -50°C to +50°C. A baseline temperature calibration was performed with each T-Sonde by the adjustment of the recorded temperature to match the thermometer measured temperature next to the transmitting sonde. Once the calibration check was finished the balloon was released with the sonde attached and the temperature was recorded for at least 20 minutes. At the completion of each observation the data were mailed to Aeromet, Inc.

The Seasonal Progress Report is divided into seven parts, one corresponding to each of the seven field sites. The temperature and wind data were not edited after the completion of the Monthly Progress Reports.

2.0 DATA SUMMARY

2.1 Mixing Layer Height

The average mixing layer height was computed for the morning and afternoon based on the morning and 1400L temperature soundings. The balloon release ½ hour after sunrise is near enough to the minimum temperature to assume the correctness of the calculated mixing layer heights. The afternoon balloon release is generally not at the time of maximum heating and the user of the mixing layer height data must be aware that minor changes in the calculated values can be expected. Without equipping the field sites with minimum/maximum thermometers the extrapolation of the afternoon data cannot be justified in establishing a data base for statistical analysis. The approximation of the afternoon maximum temperature would be a "calculated guess" for there are: 1) local effects which are to be determined and would be filtered out with extrapolation, 2) mountain effects which alter the lower 1500m (e.g. downslope effects), and 3) meteorological effects which can alter the expected change in the sounding (e.g. advection, moisture, etc.).

It is felt that to better define the mixing layer height a variety of "heat island" effects should be viewed. The rigourous method would be to define 15 "heat island" effects ranging from 0 to 14°C and let the user decide which would best serve his needs. However, for this analysis 0°, +5° and +10° "heat island" effects are calculated and listed for the morning and afternoon soundings in the table Average Mixing Layer Height.

A summary of the average mixing layer heights calculated with the 0°, +5° and +10° "heat island" effects for each of the seven field sites for the winter season of December 1976, January and February 1977 are included in the report. The percent of occurrence of the average height within 250m increments above ground level is given in tabular form. The total number of soundings included in the sample populations are listed in the table.

2.2 Stability and Inversion Classification

The temperature and wind data were edited to remove data felt to cause anomalous results in the stability and inversion classification schemes. Only the stations listed prior to the table classifying the inversions were used in the calculations.

The temperature data are processed to produce for each site a seasonal summary of inversion layers and lapse rates within the inversions and from the inversion base to the surface by means of the Holzworth classificaiton scheme for inversions (Holzworth, G. C., 1974: "Climatological Data on Atmospheric Stability in the United States" paper presented at the American Meteorological Society Symposium on Atmospheric Diffusion and Air Pollution, September 9-13, 1974, Santa Barbara, California.)

The temperature and wind data are processed together to produce for each site a monthly average bivariate frequency distribution of wind direction versus wind speed represented in the 500m layer adjacent to the ground. The distribution is presented by the six Pasquill stability classes (A-F) and a summary independent of stability. If the $\Delta T/100m$ criterion is met but the wind speed criterion is not met, then the wind data are checked against the criterion

STABILITY CLASS	ΔT (°C/100m)	WIND SPEED (m s^{-1})
A	<-1.9	≤2
B	-1.9 - -1.7	≤5
C	-1.7 - -1.5	≤6
D	-1.5 - -0.5	ALL SPEEDS
E	-0.5 - 1.5	≤5
F	>1.5	≤3

for the next stability class, always cascading to the D stability class. Once the wind speed criterion is met the data are classified under the new stability class even though now the lapse rate exceeds the class criterion. For example, if the $\Delta T/100m$ value is 1.7 and the wind speed is 7 m s^{-1}, the lapse rate criterion is met for the stability class F, however the wind speed criterion is exceeded. The wind speed is greater than the 5 m s^{-1} maximum limit for class E but falls within the criterion of class D, which includes all wind speeds. As a result the observational data with a ΔT value of 1.7°C/100m and a wind speed value of 7 m s^{-1} are classified under stability class D, not class F.

The data are also punched on computer cards in a format compatible with the STAR PROGRAM of the National Climatic Center, NOAA, U.S. Department of Commerce. A detailed description of the punched output can be found in the Monthly Progress Reports.

AVERAGE MIXING LAYER HEIGHT

Colorado C-b Tract

Season: December, January, February

MIXING LAYER HEIGHT (Height in meters)	PERCENT OF OCCURRENCE					
	MORNING			AFTERNOON		
	0°	+5°	+10°	0°	+5°	+10°
surface	61.3			21.9		
1 - 250m	25.8	58.1	30.0	15.6	6.3	6.3
251 - 500m	3.2	12.9	16.7	6.3		
501 - 750m		3.2	10.0	12.5		
751 - 1000m		9.7	3.3	12.5	3.1	
1001 - 1250m	9.7	3.2	6.7	6.3	12.5	
1251 - 1500m		3.2	3.3	6.3	12.5	3.1
1501 - 1750m		3.2	3.3	9.4	15.6	3.1
1751 - 2000m			6.7	3.1	9.4	
> 2000m		3.2	16.7	6.3	31.2	46.9
None defined		3.2	3.3		9.4	40.6
TOTAL NUMBER	31	31	30	32	32	32

COL CB TRACT ELEV 2042 METERS SOUNDING ID 2861

DATE 12/02/76 TIME 08:30MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
0.	229.	0.42	0.0

COL CB TRACT ELEV 2042 METERS SOUNDING ID 2866

DATE 12/02/76 TIME 15:30MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
339.	377.	0.0	-1.06

COL CB TRACT ELEV 2042 METERS SOUNDING ID 2862

DATE 12/03/76 TIME 13:30MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
677.	715.	2.02	-0.99

COL CB TRACT ELEV 2042 METERS SOUNDING ID 2864

DATE 12/06/76 TIME 07:55MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

THERE ARE INSUFFICIENT DATA WITHIN 2000M OF THE SFC

COL CB TRACT ELEV 2042 METERS SOUNDING ID 2360

DATE 12/06/76 TIME 14:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
584.	627.	0.0	-1.03

COL CB TRACT ELEV 2042 METERS SOUNDING ID 2858

DATE 12/08/76 TIME 08:30MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
305.	419.	0.17	-0.71

COL CB TRACT ELEV 2042 METERS SOUNDING ID 2859

DATE 12/08/76 TIME 13:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
343.	381.	0.0	-0.56

COL CB TRACT ELEV 2042 METERS SOUNDING ID 2853

DATE 12/10/76 TIME 08:15MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
515.	744.	1.08	-1.00

COL CB TRACT ELEV 2042 METERS SOUNDING ID 2852

DATE 12/10/76 TIME 12:30MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
730.	1015.	1.11	-1.32

COL CB TRACT ELEV 2042 METERS SOUNDING ID 2855

DATE 01/05/77 TIME 08:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
152.	724.	0.70	-0.98

COL CB TRACT ELEV 2042 METERS SOUNDING ID 2857

DATE 01/05/77 TIME 14:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
191.	229.	0.0	-0.86

COL CB TRACT ELEV 2042 METERS SOUNDING ID 2847

DATE 01/07/77 TIME 08:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
38.	533.	0.70	-0.50

COL CB TRACT ELEV 2042 METERS SOUNDING ID 2846

DATE 01/07/77 TIME 14:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
634.	672.	0.79	-1.05

COL CB TRACT ELEV 2042 METERS SOUNDING ID 2840

DATE 01/09/77 TIME 08:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
0.	572.	0.53	0.0

COL CB TRACT ELEV 2042 METERS SOUNDING ID 2848

DATE 01/09/77 TIME 14:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
1452.	1508.	0.0	-0.93

COL CB TRACT ELEV 2042 METERS SOUNDING ID 2849

DATE 01/11/77 TIME 08:30MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
0.	305.	5.49	0.0

COL CB TRACT ELEV 2042 METERS SOUNDING ID 2850

DATE 01/11/77 TIME 14:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
0.	267.	3.87	0.0

COL CB TRACT ELEV 2042 METERS SOUNDING ID 2851

DATE 01/13/77 TIME 08:20MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

THERE ARE INSUFFICIENT DATA WITHIN 2000M OF THE SFC

COL CB TRACT ELEV 2042 METERS SOUNDING ID 3395

DATE 01/13/77 TIME 16:30MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

THERE ARE NO INVERSION BASES WITHIN 1500M OF THE SFC

LAYER BASE METERS AGL	LAYER TOP METERS AGL	DT/DZ (DEG C)/100M
0.	100.	-1.52
100.	250.	-0.70
250.	500.	-0.95
500.	750.	-1.00
750.	1000.	-0.96
1000.	1500.	-1.00

COL CB TRACT ELEV 2042 METERS SOUNDING ID 3395

DATE 01/15/77 TIME 08:30MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
0.	1146.	0.39	0.0

COL CB TRACT ELEV 2042 METERS SOUNDING ID 3396

DATE 01/17/77 TIME 08:24MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
0.	419.	1.65	0.0

COL CB TRACT ELEV 2042 METERS SOUNDING ID 3399

DATE 01/17/77 TIME 14:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
647.	685.	0.0	-1.03

COL CB TRACT ELEV 2042 METERS SOUNDING ID 3390

DATE 01/19/77 TIME 08:15MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
402.	440.	0.73	-1.49

COL CB TRACT ELEV 2042 METERS SOUNDING ID 3383

DATE 01/19/77 TIME 14:20MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
0.	381.	3.12	0.0

COL CB TRACT ELEV 2042 METERS SOUNDING ID 3388

DATE 01/21/77 TIME 08:15MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
0.	287.	3.41	0.0

COL CB TRACT ELEV 2042 METERS SOUNDING ID 3400

DATE 01/21/77 TIME 14:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
953.	991.	0.0	-0.92

COL CB TRACT ELEV 2042 METERS SOUNDING ID 3386

DATE 01/23/77 TIME 08:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
285.	323.	0.0	-0.96

COL CB TRACT ELEV 2042 METERS SOUNDING ID 3392

DATE 01/23/77 TIME 14:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
76.	136.	0.0	-2.27

COL CB TRACT ELEV 2042 METERS SOUNDING ID 3391

DATE 01/25/77 TIME 14:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
0.	419.	1.92	0.0

COL CB TRACT ELEV 2042 METERS SOUNDING ID 3390

DATE 01/25/77 TIME 14:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
0.	38.	0.0	0.0

COL CB TRACT ELEV 2042 METERS SOUNDING ID 3389

DATE 01/27/77 TIME 08:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
0.	495.	1.83	0.0

COL CB TRACT ELEV 2042 METERS SOUNDING ID 3382

DATE 01/27/77 TIME 14:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
706.	744.	0.50	-1.07

COL CB TRACT ELEV 2042 METERS SOUNDING ID 4116

DATE 01/29/77 TIME 08:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
0.	419.	3.43	0.0

COL CB TRACT ELEV 2042 METERS SOUNDING ID 4126

DATE 01/29/77 TIME 14:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
0.	76.	2.35	0.0

COL CB TRACT ELEV 2042 METERS SOUNDING ID 4122

DATE 01/31/77 TIME 08:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
0.	457.	3.04	0.0

COL CB TRACT ELEV 2042 METERS SOUNDING ID 4123

DATE 01/31/77 TIME 14:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
1363.	1421.	0.0	-0.95

COL CB TRACT ELEV 2025 METERS SOUNDING ID 0

DATE 02/02/77 TIME 08:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
166.	281.	0.0	-1.17

COL CB TRACT ELEV 2025 METERS SOUNDING ID 4117

DATE 02/02/77 TIME 14:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
0.	38.	0.0	0.0

COL CB TRACT ELEV 2025 METERS SOUNDING ID 4110

DATE 02/04/77 TIME 08:20MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
0.	495.	1.34	0.0

COL CB TRACT ELEV 2025 METERS SOUNDING ID 4120

DATE 02/04/77 TIME 14:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
597.	655.	0.0	-1.22

COL CB TRACT ELEV 2025 METERS SOUNDING ID 4118

DATE 02/06/77 TIME 08:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
0.	610.	2.06	0.0

COL CB TRACT ELEV 2025 METERS SOUNDING ID 4119

DATE 02/06/77 TIME 14:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
333.	371.	0.50	-1.00

COL CB TRACT ELEV 2025 METERS SOUNDING ID 4108

DATE 02/08/77 TIME 08:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
0.	381.	4.03	0.0

COL CB TRACT ELEV 2025 METERS SOUNDING ID 4107

DATE 02/08/77 TIME 14:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
0.	38.	0.0	0.0

COL CB TRACT ELEV 2025 METERS SOUNDING ID 4109

DATE 02/10/77 TIME 08:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
0.	762.	1.89	0.0

COL CB TRACT ELEV 2025 METERS SOUNDING ID 4124

DATE 02/10/77 TIME 14:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
0.	30.	0.73	0.0

COL CB TRACT ELEV 2025 METERS SOUNDING ID 4117

DATE 02/12/77 TIME 08:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
0.	800.	1.45	0.0

COL CB TRACT ELEV 2025 METERS SOUNDING ID 4122

DATE 02/12/77 TIME 14:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
114.	159.	0.20	-1.50

COL CB TRACT ELEV 2025 METERS SOUNDING ID 4111

DATE 02/14/77 TIME 08:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
150.	297.	0.41	-1.75

COL CB TRACT ELEV 2025 METERS SOUNDING ID 4114

DATE 02/16/77 TIME 14:[illegible]MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
727.	770.	0.0	-1.10

****

COL CB TRACT ELEV 2025 METERS SOUNDING ID 4115

DATE 02/16/77 TIME 08:25MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
0.	533.	1.30	0.0

****

COL CB TRACT ELEV 2025 METERS SOUNDING ID 3784

DATE 02/16/77 TIME 14:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
0.	38.	0.97	0.0

****

COL CB TRACT ELEV 2025 METERS SOUNDING ID 3786

DATE 02/18/77 TIME 08:10MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
0.	305.	2.20	0.0

****

COL CB TRACT ELEV 2025 METERS SOUNDING ID 3785

DATE 02/18/77 TIME 14:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
310.	354.	0.73	-1.55

****

COL CB TRACT ELEV 2025 METERS SOUNDING ID 3791

DATE 02/21/77 TIME 08:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
0.	191.	2.92	0.0

****

COL CB TRACT ELEV 2025 METERS SOUNDING ID 3787

DATE 02/21/77 TIME 14:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

THERE ARE NO INVERSION BASES WITHIN 1500M OF THE SFC

LAYER BASE METERS AGL	LAYER TOP METERS AGL	DT/DZ (DEG C)/100M
0.	100.	-1.53
100.	250.	-0.76
250.	500.	-1.16
500.	750.	-0.90
750.	1000.	-1.04
1000.	1500.	-1.01

COL CB TRACT ELEV 2025 METERS SOUNDING ID 3790

DATE 2/22/77 TIME 08:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
649.	688.	0.0	-1.00

****

COL CB TRACT ELEV 2025 METERS SOUNDING ID 3778

DATE 02/22/77 TIME 14:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
550.	568.	1.26	-1.17

****

COL CB TRACT ELEV 2025 METERS SOUNDING ID 3776

DATE 02/24/77 TIME 08:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
1188.	1226.	0.52	-0.97

****

COL CB TRACT ELEV 2025 METERS SOUNDING ID 3777

DATE 02/24/77 TIME 14:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
0.	152.	0.87	0.0

****

COL CB TRACT ELEV 2025 METERS SOUNDING ID 3781

DATE 02/26/77 TIME 08:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
0.	419.	0.89	0.0

****

COL CB TRACT ELEV 2025 METERS SOUNDING ID 3783

DATE 02/26/77 TIME 14:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

THERE ARE NO INVERSION BASES WITHIN 1500M OF THE SFC

LAYER BASE METERS AGL	LAYER TOP METERS AGL	DT/DZ (DEG C)/100M
0.	100.	-1.90
100.	250.	-0.73
250.	500.	-1.03
500.	750.	-1.09
750.	1000.	-1.05
1000.	1500.	-0.99

****

COL CB TRACT ELEV 2025 METERS SOUNDING ID 3782

DATE 02/28/77 TIME 08:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
76.	207.	1.61	-0.38

COL CR TRACT ELEV 2025 METERS SOUNDING ID 5780

DATE 02/28/77 TIME 14:00MST ASCENT RATE 500 FPM DATA INTERVAL 15 SEC.

INV BASE METERS AGL	INV TOP METERS AGL	INV DT/DZ (DEG C)/100M	DT/DZ BELOW INV (DEG C)/100M
38.	114.	6.37	-3.44

MONTH: D J F YEAR: 76-77 COL CR TRACT ELEV 2025 METERS

HOLZWORTH'S CLASSIFICATION SCHEME FOR INVERSIONS
MODIFIED TO SHOW TOTAL NUMBER INSTEAD OF PERCENT

THICKNESS (METERS)	SFC	INVERSION BASE HEIGHT (M) 1- 100	101- 250	251- 500	501- 750	751- 1000	1001- 1500	1501- 2000	2001- 2500	2501- 3000	TOTAL
1 - 100	6	2	2	5	8	2	5	0	0	0	29
101 - 250	3	1	2	1	1	0	0	0	0	0	8
251 - 500	13	1	0	0	1	0	0	0	0	0	15
501 - 750	3	0	1	0	0	0	0	0	0	0	4
751 - 1000	2	0	0	0	0	0	0	0	0	0	2
1001 - 1500	1	0	0	0	0	0	0	0	0	0	1
> 1500	0	0	0	0	0	0	0	0	0	0	0
INV TOTAL	26	4	5	7	10	2	5	0	0	0	59
DT/DZ 5		1	0	0	0	0	0	0	0	0	1
FROM INV 4		1	0	2	0	0	0	0	0	0	3
BASE 3		0	3	3	8	2	3	0	0	0	19
TO 2		0	1	2	2	0	0	0	0	0	5
SFC 1		2	1	0	0	0	0	0	0	0	3
NO INV TO1		3	3	5	3	5	5	DT/DZ (DEG C)/100M			
DT/DZ FOR 5		0	0	0	0	0	0	5= 0.00 TO -0.40			
SAME 4		0	3	0	0	0	0	4=-0.41 TO -0.80			
LAYERS 3		0	0	3	3	3	3	3=-0.81 TO -1.20			
AS INV 2		2	0	0	0	0	0	2=-1.21 TO -1.60			
BASE 1		1	0	0	0	0	0	1=<-1.60			

MONTH: D J F YEAR: 76-77 COL CB TRACT SFC TO 500 METERS

NORMALIZED FREQUENCY DISTRIBUTION

DIRECTION	SPEED (METER/SEC) 0-3	4-6	7-10	11-16	17-21	GREATER THAN 21	AVERAGE SPEED	TOTAL
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AVG SPEED	0.0	0.0	0.0	0.0	0.0	0.0		0.0
TOTAL	0.0	0.0	0.0	0.0	0.0	0.0		0.0

RELATIVE FREQUENCY OF OCCURRENCE OF THE A STABILITY CLASS IS 0.0

RELATIVE FREQUENCY OF CALM 0.0

A TOTAL OF 12 SOUNDINGS FROM A SAMPLE OF 64 SOUNDINGS DID NOT HAVE 500 M OF TEMP AND WIND DATA

MONTH: D J F YEAR: 76-77 COL CB TRACT SFC TO 500 METERS

NORMALIZED FREQUENCY DISTRIBUTION

DIRECTION	SPEED (METER/SEC) 0-3	4-6	7-10	11-16	17-21	GREATER THAN 21	AVERAGE SPEED	TOTAL
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AVG SPEED	0.0	0.0	0.0	0.0	0.0	0.0		0.0
TOTAL	0.0	0.0	0.0	0.0	0.0	0.0		0.0

RELATIVE FREQUENCY OF OCCURRENCE OF THE B STABILITY CLASS IS 0.0

RELATIVE FREQUENCY OF CALM 0.0

A TOTAL OF 12 SOUNDINGS FROM A SAMPLE OF 64 SOUNDINGS DID NOT HAVE 500 M OF TEMP AND WIND DATA

MONTH: D J F YEAR: 76-77 COL CO TRACT SFC TO 500 METERS

NORMALIZED FREQUENCY DISTRIBUTION

DIRECTION	SPEED (METER/SEC) 0-3	4-6	7-10	11-16	17-21	GREATER THAN 21	AVERAGE SPEED	TOTAL
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AVG SPEED	0.0	0.0	0.0	0.0	0.0	0.0		0.0
TOTAL	0.0	0.0	0.0	0.0	0.0	0.0		0.0

RELATIVE FREQUENCY OF OCCURRENCE OF THE C STABILITY CLASS IS 0.0

RELATIVE FREQUENCY OF CALM 0.0

A TOTAL OF 12 SOUNDINGS FROM A SAMPLE OF 64 SOUNDINGS DID NOT HAVE 500 M OF TEMP AND WIND DATA

MONTH: D J F YEAR: 76-77 COL CO TRACT SFC TO 500 METERS

NORMALIZED FREQUENCY DISTRIBUTION

DIRECTION	SPEED (METER/SEC) 0-3	4-6	7-10	11-16	17-21	GREATER THAN 21	AVERAGE SPEED	TOTAL
N	0.0	0.04	0.0	0.0	0.0	0.0	4.4	0.04
NNE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.07	0.0	0.0	0.0	0.0	0.0	1.5	0.07
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.04	0.0	0.0	0.0	0.0	0.0	1.7	0.04
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	0.04	0.0	0.0	0.0	0.0	0.0	6.9	0.04
S	0.04	0.0	0.0	0.0	0.0	0.0	2.1	0.04
SSW	0.14	0.21	0.04	0.04	0.0	0.0	4.8	0.43
SW	0.04	0.0	0.0	0.0	0.0	0.0	1.1	0.04
WSW	0.0	0.0	0.07	0.0	0.0	0.0	7.8	0.07
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.11	0.0	0.0	0.0	0.0	4.3	0.11
NW	0.04	0.04	0.0	0.0	0.0	0.0	3.3	0.07
NNW	0.04	0.04	0.0	0.0	0.0	0.0	2.2	0.07
AVG SPEED	1.7	4.4	8.5	10.5	0.0	0.0		0.0
TOTAL	0.43	0.43	0.11	0.04	0.0	0.0		1.00

RELATIVE FREQUENCY OF OCCURRENCE OF THE D STABILITY CLASS IS 0.54

RELATIVE FREQUENCY OF CALM 0.0

A TOTAL OF 12 SOUNDINGS FROM A SAMPLE OF 64 SOUNDINGS DID NOT HAVE 500 M OF TEMP AND WIND DATA

MONTH: D J F YEAR: 76-77 COL CB TRACT SFC TO 500 METERS

NORMALIZED FREQUENCY DISTRIBUTION

DIRECTION	SPEED (METER/SEC) 0-3	4-6	7-10	11-16	17-21	GREATER THAN 21	AVERAGE SPEED	TOTAL
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.06	0.0	0.0	0.0	0.0	0.0	1.8	0.06
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.19	0.0	0.0	0.0	0.0	0.0	1.8	0.19
SE	0.0	0.13	0.0	0.0	0.0	0.0	5.7	0.13
SSE	0.19	0.06	0.0	0.0	0.0	0.0	2.6	0.25
S	0.13	0.06	0.0	0.0	0.0	0.0	2.8	0.19
SSW	0.06	0.06	0.0	0.0	0.0	0.0	3.0	0.13
SW	0.06	0.0	0.0	0.0	0.0	0.0	1.9	0.06
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AVG SPEED	2.1	3.5	0.0	0.0	0.0	0.0		0.0
TOTAL	0.69	0.31	0.0	0.0	0.0	0.0		1.00

RELATIVE FREQUENCY OF OCCURRENCE OF THE E STABILITY CLASS IS 0.31

RELATIVE FREQUENCY OF CALM 0.0

A TOTAL OF 12 SOUNDINGS FROM A SAMPLE OF 64 SOUNDINGS DID NOT HAVE 500 M OF TEMP AND WIND DATA

MONTH: D J F YEAR: 76-77 COL CO TRACT SFC TO 500 METERS

NORMALIZED FREQUENCY DISTRIBUTION

DIRECTION	SPEED (METER/SEC) 0-3	4-6	7-10	11-16	17-21	GREATER THAN 21	AVERAGE SPEED	TOTAL
N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNE	0.13	0.0	0.0	0.0	0.0	0.0	2.1	0.13
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.13	0.0	0.0	0.0	0.0	0.0	1.7	0.13
SE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSE	0.03	0.0	0.0	0.0	0.0	0.0	2.2	0.03
S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
W	0.13	0.0	0.0	0.0	0.0	0.0	1.4	0.13
WNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NNW	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AVG SPEED	2.0	0.0	0.0	0.0	0.0	0.0		0.0
TOTAL	1.00	0.0	0.0	0.0	0.0	0.0		1.00

RELATIVE FREQUENCY OF OCCURRENCE OF THE F STABILITY CLASS IS 0.15

RELATIVE FREQUENCY OF CALM 0.0

A TOTAL OF 12 SOUNDINGS FROM A SAMPLE OF 64 SOUNDINGS DID NOT HAVE 500 M OF TEMP AND WIND DATA

MONTH: D J F YEAR: 76-77 COL CB TRACT SFC TO 500 METERS

NORMALIZED FREQUENCY DISTRIBUTION

DIRECTION	SPEED (METER/SEC) 0-3	4-6	7-10	11-16	17-21	GREATER THAN 21	AVERAGE SPEED	TOTAL
N	0.0	0.02	0.0	0.0	0.0	0.0	4.4	0.02
NNE	0.04	0.0	0.0	0.0	0.0	0.0	2.0	0.04
NE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ENE	0.04	0.0	0.0	0.0	0.0	0.0	1.5	0.04
E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ESE	0.10	0.0	0.0	0.0	0.0	0.0	1.8	0.10
SE	0.0	0.04	0.0	0.0	0.0	0.0	3.7	0.04
SSE	0.17	0.02	0.0	0.0	0.0	0.0	2.2	0.19
S	0.06	0.02	0.0	0.0	0.0	0.0	2.6	0.08
SSW	0.10	0.13	0.02	0.02	0.0	0.0	4.5	0.27
SW	0.04	0.0	0.0	0.0	0.0	0.0	1.5	0.04
WSW	0.0	0.0	0.04	0.0	0.0	0.0	7.8	0.04
W	0.02	0.0	0.0	0.0	0.0	0.0	1.4	0.02
WNW	0.0	0.06	0.0	0.0	0.0	0.0	4.3	0.06
NW	0.02	0.02	0.0	0.0	0.0	0.0	3.3	0.04
NNW	0.02	0.02	0.0	0.0	0.0	0.0	2.2	0.04
AVG. SPEED	1.9	4.2	8.5	10.5	0.0	0.0		0.0
TOTAL	0.60	0.33	0.06	0.02	0.0	0.0		1.00

NORMALIZED FREQUENCY DISTRIBUTION INDEPENDENT OF STABILITY

RELATIVE FREQUENCY OF CALM 0.0

A TOTAL OF 12 SOUNDINGS FROM A SAMPLE OF 64 SOUNDINGS DID NOT HAVE 500 M OF TEMP AND WIND DATA

TN 24 .U52 W449 no.

Form 1279–3
(June 1984)

BORROWER

Seasonal progress
the period

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